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Refuge Update

National Wildlife Refuge System
www.fws.gov/refuges

Farallon National Wildlife Refuge, CA

The U.S. Fish and Wildlife Service and its partners expect to form a national network of 21 landscape conservation cooperatives by 2012. (USFWS)

The Right Science in the Right Places

By David Eisenhauer

The U.S. Fish and Wildlife Service is working with diverse partners to establish a national network of applied conservation science partnerships in response to broad-scale resource threats such as global climate change.

A centerpiece of the Department of the Interior and Service climate change strategies, these partnerships, called landscape conservation cooperatives, or LCCs, will be composed of federal agencies, states, tribes, non-governmental organizations (NGOs), universities and stakeholders within a geographically defined area.

Service Deputy Director Dan Ashe says the cooperatives' primary function is to build shared science capacity to inform resource management decisions addressing a range of stressors at "landscape" scales, or the entire range of an identified priority species or groups of species. Stressors include habitat fragmentation, contamination, invasive species, water scarcity and energy development – all of which are compounded by accelerating climate change.

LCC scientists, using advanced computer models and predictive data from DOI Regional Climate Change Response Centers, will forecast how climate change could alter regional ecosystems decades from now. That, in turn, will help resource managers determine adaptive conservation strategies and actions that anticipate changes in habitat and the abundance and distribution of species.

"Landscape conservation cooperatives give resource managers the information they need to make decisions based on sound science," Ashe says. "For a refuge

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The Case of the Missing Auklets

By Susan Morse

The hoary marmots have to go. So say biologists at Alaska Maritime National Wildlife Refuge about the prairie dog cousins suspected of out-competing native seabirds for nesting habitat on tiny Sud Island in the Barren Islands. Pending an environmental assessment this winter, biologists hope to rid the island of the non-native pests, much as they have purged other islands of non-native foxes and rats that threatened native species.

"If we choose to do nothing about invasives, we're choosing against natural biodiversity," says Steve Ebbert, invasive species coordinator. The refuge, which is made up of 2,500 volcanic islands, stretches more than 1,000 miles into the Pacific Ocean spanning much of the mainland Alaska coast.

Arctic and red foxes introduced to the islands by fur trappers drove the Aleutian cackling goose almost to

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From the Director

Wilderness Stewardship Is More Important Than Ever

Sam Hamilton

The U.S. Fish and Wildlife Service, along with six other agencies, signed a groundbreaking Memorandum of Understanding on Cooperation for Wilderness Conservation with Mexico and Canada during the 9th World Wilderness Congress, held near the end of last year. The agreement recognizes natural resources do not start and end with geographical boundaries and encourages cooperative efforts amongst the three nations to conduct and share scientific research.

The MOU also creates a framework for cooperation to promote wilderness conservation, facilitate coordination of trans-boundary conservation initiatives and serve as a model for other nations.

The Service works to preserve America's wilderness character, as exemplified by the National Wildlife Refuge System, which has 75 designated wilderness areas on 63 units in 26 states. The Refuge System's wilderness includes diverse landscapes ranging from the tundra of the Arctic to the rocky Oregon coast, from the desert at Cabeza Prieta Refuge in Arizona to the great Okefenokee Swamp in Georgia.

As stewards of wilderness, we must work to ensure that all Americans have opportunities to experience the unconfined and untamed outdoors – even a chance for solitude – that is the very essence of connecting with nature.

The MOU provides for large, relatively pristine protected marine areas with

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Chief's Corner

A Place of Renewal

Greg Siekaniec

For the past quarter century, Katy Sheehan Morris and Susan Macdonald Bray have kept their friendship fresh and vibrant through their connection with Swan Lake National Wildlife Refuge in Missouri. Sure, Katy was a bridesmaid in Susan's wedding. And for years, they've swapped stories about child rearing and family successes and travails.

But what's given them a sense of renewal year after year? A fall weekend of birding, hiking and camping at Swan Lake Refuge, an easy drive from Kansas City. They missed the annual trip the year that Bray got married and for a few years when pregnancies made such travel a little tough. But they haven't skipped the trip for very many years.

They camp at Pershing State Park, next door to Swan Lake Refuge, where they have seen coyote pups, armadillos, egrets and white pelicans – including the pelican migration. "For me, this trip is a renewal," says Bray, who works for the Kansas City Department of Parks and Recreation. "I couldn't go into winter without hearing the wild call of geese every fall," says Morris, who trained as a naturalist – as did Bray.

They discovered Swan Lake Refuge when they led a children's field trip to the refuge and learned of its wildness and naturalist values. "Thank goodness for the Refuge System and its pockets of nature," says Morris.

Typical story? Not really. But more and more, it should be – and it could be.

The first step for us is to understand that being comfortable and knowledgeable about the natural world isn't second

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Refuge Update

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Inside

More People AND More Seabirds

By Roy W. Lowe

Large numbers of people and sensitive nesting seabirds typically don't mix well. Yet effective collaboration and careful management have dramatically increased both visitor use and the seabird nesting population on Yaquina Head, a small coastal headland jutting into the Pacific Ocean off the coast of Oregon.

In 1968, Colony Rock, adjacent to Yaquina Head, became part of Oregon Islands National Wildlife Refuge. In 1980, Congress designated the Yaquina Head Outstanding Natural Area (YHONA) and placed it under the administration of the Bureau of Land Management (BLM). At the time, an active rock quarry was slowly chewing away at the magnificent scenery and wildlife habitat.

By 1980, the headland had long been known as the local party spot. Reports of individuals shooting seabirds for target practice along with other activities detrimental to nesting seabirds and other wildlife were frequent.

With the establishment of YHONA, it was clear that visitation to the headland was going to increase and could have further adverse impacts to seabirds and harbor seals using the refuge rocks as breeding habitat. From the very beginning, BLM and U.S. Fish and Wildlife Service worked together at Yaquina Head to promote public uses compatible with wildlife. The quarry operation was terminated in 1983, public access to sensitive areas of the headland was prevented, and such public use programs as wildlife observation and photography, interpretation and environmental education were ramped up during the 1990s.

Extraordinary Increases in Visitors and Birds

Nearly three decades of cooperative management at Yaquina Head have paid off with unimaginable results. Public visitation to the headland has increased by as much as 400 percent since 1980 even as the breeding population of Brandt's cormorants increased more than 2,100 percent and breeding common murres by 1,600 percent. The number of nesting colonies increased from one each on Colony Rock to at least 11 sites for the cormorants and seven for murres. This includes locations on the mainland that once experienced almost daily human foot traffic.

Common murres can easily be seen on Colony Rock from the viewing deck at Yaquina Head at Oregon Islands National Wildlife Refuge. (Roy W. Lowe)

The seabird populations breeding at Yaquina Head are now of national and international significance. The 80,000 to 90,000 common murres breeding at Yaquina Head far exceed the combined totals for all of British Columbia and Washington state. The Audubon Society of Portland has designated the headland and adjacent refuge rocks as an Important Bird Area.

In 2009, the refuge was invited by the Smithsonian Institution to give a presentation at the National Museum of Natural History during an international workshop on success stories in ocean conservation. Our message? Simple yet diligent management practices, implemented over time, will protect wildlife while accommodating visitors. These management practices can be applied almost anywhere.

We had not heard the term "ecotourism" when our efforts began in the early 1980s, but that describes our hopes for Yaquina Head. Today, Yaquina Head serves as one of the premiere seabird viewing locations in the country. From the viewing deck in the spring and summer you can stand within 150 to 300 feet of tens of thousands of common murres and other seabirds. The cacophony of bird calls emanating from the colonies, the fresh sea breeze in your face and, yes, even the "sweet" smell of a productive seabird colony stimulate all the senses.

Roy W. Lowe is project leader at Oregon Coast National Wildlife Refuge Complex.

Studying Nesting on Coastal Plain

By Steven Kendall

The U.S. Fish and Wildlife Service and a diverse group of partners collaborated on the first-ever multi-year, multi-site study to investigate indirect effects of human development on nesting birds across a large swath of the Arctic Coastal Plain in northern Alaska. Human development has increased in recent decades, primarily due to oil and gas exploration and production.

The ground-breaking study, whose results were published in September 2009 in *Ecological Applications,* investigated whether predation impacted nesting success of migratory birds that breed near developed areas on the Arctic Coastal Plain. For most of the species studied, there did not appear to be lower nest survival near oilfield facilities. However – and this is a big "but" – natural variability (from year to year and place to place) may have kept investigators from detecting subtle but important effects. Evidence suggests that opportunistic predators like arctic foxes, ravens and gulls are attracted to human infrastructure in oilfields and villages, primarily because they can find edible waste in garbage. They also use human structures as nesting, perching or denning sites, which otherwise can be limited in this landscape.

The Arctic National Wildlife Refuge and the Fish and Wildlife Field Office in Fairbanks, the Wildlife Conservation Society, ConocoPhillips Alaska Inc., BP Exploration (Alaska) Inc. and the Manomet Center for Conservation Sciences were partners in the study.

From 2002 to 2005, investigations were conducted at seven sites at various distances from infrastructure, ranging from 300 feet in the oilfields at Prudhoe Bay and Kuparuk to tens of miles in the Arctic Refuge and the National Petroleum Reserve–Alaska. The study monitored nearly 2,000 nests of 17 species of shorebirds and songbirds. A study of this scale could not have been done without collaboration between non-government organizations as well as federal and industry scientists.

A new study has determined that some shorebirds and songbirds like the Lapland longspur have lower nest survival in areas adjacent to human development near the Arctic National Wildlife Refuge, AK. (USFWS)

Mixed Results

The study found that the Lapland longspur, a nesting songbird, has lower nest survival in areas adjacent to infrastructure. But that was not observed for nesting shorebirds, although nesting survival for all species was highly variable between years and sites. For example, both the highest and lowest overall nest survivorship in consecutive years was found at the Canning River site in the Arctic Refuge. Such extreme natural variability has been reported for other studies in the Arctic, and creates challenges in trying to evaluate other factors that influence nest survival. Effects from human development are difficult to detect against this "noisy" background.

The Arctic Coastal Plain is of vital importance to breeding birds that migrate from around the globe to nest during the brief, productive arctic summer. Many of the bird species studied are declining, primarily because of habitat loss on their wintering grounds and in migration stopover sites outside of the Arctic. A small additive effect on the Arctic breeding grounds that results in decreased nest success could be important from a conservation standpoint.

The common-sense approach is to continue to implement best management practices to minimize predator attraction to human developments. Since the initial development of the Prudhoe Bay oil field, industry officials have taken significant steps to reduce food availability for predators in and around oilfields. The collaborators on this study recommend that these measures continue to be implemented at future oil and gas exploration and development sites.

When possible, new infrastructure should be designed to limit availability for nesting, perching or denning by predators. Continued monitoring of nesting bird populations in the Arctic is important, as is additional research on predator populations and their effects on nesting birds. Measuring potential effects will require continuing collaborative approaches such as this project to implement long-term monitoring efforts and innovative approaches in research design.

Steven Kendall is a wildlife biologist and ornithologist at the Arctic National Wildlife Refuge, AK.

Encouraging Kids to Look Closely

By Mary Tillotson

Phil Huxford and Steve Hoddy, born within months of each other more than 50 years ago, grew up a continent apart. But as boys they shared a passion for the outdoors.

Huxford says whenever he came home in New Jersey with his hands cupped, his mother ran for a paper bag to trap his "catch." She knew from experience he was holding a frog or some other wild critter.

Hoddy spent most of his boyhood in Southern California, but was visiting Louisiana when his grandfather introduced him to bird watching when he was nine.

Huxford grew up to work in construction and landscaping in Texas. Hoddy became an animal trainer, master falconer and founder of a nonprofit environmental education organization, Earthquest, based in Georgia.

Now they've joined forces to share their love of nature with Houston-area residents, especially children.

Huxford is a moving force in the nonprofit, volunteer Friends of Brazoria National Wildlife Refuge. The refuge, on the Texas Gulf Coast about 60 miles from Houston, is a winter home to sandhill cranes, snow geese and other species. Herons, egrets, white ibis and roseate spoonbills summer there. In spring, migrating songbirds stop at Brazoria Refuge on their way north from Yucatan.

Fifteen years ago, Huxford helped organize the refuge's Spring Migration Festival. Refuge staff and Friends recruited Steve Hoddy to bring his birds-of-prey program to the festival – a reminder to Houstonians of the natural world at the backdoor of their traffic-clogged metropolis.

Meeting the Kids

But seven years ago, Huxford and Bryan Adams, an education specialist with the Texas Mid-Coast National Wildlife Refuge Complex that encompasses Brazoria Refuge, decided to reach an even wider audience – Houston-area school kids.

That first year, Huxford and falconer Hoddy brought the birds-of-prey show to some 2,200 children and teachers in five schools. By 2009, Huxford and Hoddy offered their half-hour presentation in 18 schools, to more than 9,000 students and teachers from grades pre-K through middle school.

"It's not just a warm, fuzzy program about birds," says Huxford. "It's about awareness. Trying to get the kids – and the teachers, too – to take time and look around at them at their world. To look *closely*!"

Each Hoddy presentation costs the Friends of Brazoria $400 – Hoddy's fee plus transportation and lodging. He usually visits Texas in March or early April, promoting the refuge's Spring Migration Festival at each school, in hopes that youngsters who've seen him will enlist their parents to see the birds, too, at the refuge.

ConocoPhillips, a Houston-based oil company, has vast holdings in Brazoria County, both on- and off-shore along the Gulf and has become a reliable and generous corporate sponsor. Supporting an environmental education program is good community relations for an oil company, says Huxford, who was acquainted with some of the company's executives through his civic work. ConocoPhillips had been contributing to Brazoria Refuge's annual Spring Migration Festival for 15 years, so Huxford thought the company might also underwrite a program that benefits the children of Brazoria County, including the kids of ConocoPhillips employees. He was right.

Programs featuring birds-of-prey like the peregrine falcon help make students in Houston, TX, more aware of the natural world. (Craig Koppie)

In 2009, the company donated more than $6,000 for 20 birds-of-prey school programs, more than twice as many as the company underwrote the year before. ConocoPhillips donates another $2,000 to Brazoria Refuge's annual festival.

Hoddy generally uses five birds in his presentation: a hybrid peregrine falcon, an Andean condor, a great-horned owl, a Harris hawk and a black vulture named Igor. Hoddy's half-hour presentation (outdoors if the weather is fine; in a gym or school auditorium if it's not) begins with an overview of the birds' habitats, diets and life cycle.

Unhooded and Untethered

Then comes the kids' favorite part. Hoddy allows his trained birds, unhooded and untethered, to fly free. The birds soar over the heads of the children – doing what they would do in the wild, if the youngsters were lucky enough to see them there.

Huxford and Hoddy do not expect an immediate return for spending time and energy introducing city kids to the natural world. "It's for the future," says Huxford. "We're so urbanized now, people don't connect as much with nature. We want them to take time and look around. Want them to be aware that what we do changes the environment. The influence we have can be so subtle. But it's a start."

Mary Tillotson is a career journalist who formerly worked for the Refuge System Branch of Communications.

Raising Cane for Wildlife

By Jason Lewis

There are promising efforts by a multitude of partners, including two national wildlife refuges in Missouri and Illinois, to ensure the continued survival of giant cane and its associated wildlife. Giant cane, a North American native bamboo, is a critical and unique component of the bottomland and riparian forest ecosystems. Canebrakes, a monotypic stand of cane, were once a dominant landscape feature. There are historic descriptions of "widespread cane swamps" and "vast cane meadows," but today canebrakes have been reduced by an estimated 98 percent.

A host of wildlife species exploits the resources provided by canebrakes. The Bachman's warbler, Swainson's warbler, swamp rabbit and a multitude of insects rely on this biologically diverse community for all aspects of their life. As a result of land conversion, grazing and fire suppression, canebrakes are now classified as critically endangered plant communities and the subject of increasing restoration efforts.

Cane restoration within the Great Lakes Region was initiated by Cypress Creek National Wildlife Refuge, IL, in partnership with Southern Illinois University (SIU), one of the leading academic institutions researching cane restoration techniques. Cypress Creek Refuge has hosted several SIU graduate projects exploring cane propagation techniques. One of the principal limitations to cane restoration for land managers has been the lack of information regarding field tested propagation techniques and the availability of affordable planting stock.

Mingo National Wildlife Refuge, MO, and Cypress Creek Refuge coordinated a one-day cane restoration workshop in October 2008 to share cane restoration information and ideas between the academic community and land managers. More than 52 individuals representing 10 separate state, federal and private natural resource agencies and non-government organizations attended. Participants toured giant cane restoration sites managed by the U.S. Fish and Wildlife Service and The Nature Conservancy and gained hands-on experience in cane rhizome collecting and planting.

Greenhouse vs. Open Field

Mingo and Cypress Creek Refuges, Missouri Department of Conservation, Army Corp of Engineers, SIU and the University of Missouri developed a project to propagate cane rhizomes in a greenhouse for restoration. The goals of the project were to collect rhizomes from sites around southeast Missouri, propagate them in a greenhouse administered by the University of Missouri, and use the propagules to restore cane on state and federal lands. Secondarily, the project was designed to evaluate the variation in propagule growth and survival rates in the greenhouse from each collection site.

Approximately 4,000 rhizomes were collected in late February 2009. About 2,800 were hand-planted in the greenhouse. A subsample of the potted rhizomes was treated with a time-release fertilizer. The remaining rhizomes were either kept in cold storage and planted as bare rhizomes or donated to SIU for a genetics study.

Further study is needed to evaluate the effects of fertilization. In addition, although we know that 75 percent of the greenhouse rhizomes survived, the survival rates of field-planted propagules have yet to be determined. This will be an important factor in evaluating the success or failure of the project. The two refuges planted about eight acres with a mix of greenhouse and field-planted seedlings at about 700-800 seedlings per acre. The commercial value of the cane totaled about $60,000; we were able to complete the project for less than $8,000.

There are scores of species whose fate may rely on the outcome of this concerted endeavor.

Jason Lewis is assistant manager at Mingo National Wildlife Refuge, MO.

Giant cane rhizomes are being propagated in a greenhouse as part of an effort to ensure the survival of cane and its associated wildlife in Illinois and Missouri. (Jason Lewis/USFWS)

The Case of the Missing Auklets — *continued from page 1*

Refuge staff make camp on Sud Island at Alaska Maritime National Wildlife Refuge to search for elusive rhino auklets. (USFWS)

extinction before the U.S. Fish and Wildlife Service intervened in 1970. The goose population now numbers about 30,000, up from a low of about 600.

Accidental introductions of Norway rats have occurred on many islands; on one, an infestation caused by a Japanese shipwreck more than 200 years ago decimated local birds until the Alaska Maritime Refuge teamed with Island Conservation and The Nature Conservancy and conducted a $2.5 million rat eradication effort last year. It is too soon to say that Rat Island is definitively rat-free; however, there are signs that several species of birds, including geese, ptarmigan, black oystercatchers and peregrine falcons are starting to nest again.

Marmots were stocked on Sud Island in 1939, possibly as a food source for weather observers and lookouts stationed there during World War II. Biologists suspect the marmots upset the island's ecology by invading and disturbing the nesting burrows of rhinoceros auklets, a medium-sized puffin-like seabird. More than 500 burrows and 1,000 rhino auklets were counted by refuge biologists visiting the island in 1975; none was found in 1990. Recently, however, biologists have found signs that some small pockets of auklets may be holding out against their island invaders.

Who Goes There?

Last summer, intrigued by reports of nearby auklet sightings, Ebbert headed to Sud Island with Gulf of Alaska unit biologist Leslie Slater. Could a colony of auklets have returned to the island after an absence of 20 years, they wondered. If so, where were the birds' burrows? And how had they escaped the marmots?

Ebbert and Slater discovered some nesting burrows on the edge of a cliff, not on vegetated slopes that the auklets usually prefer. No one was home – not a surprise. In daylight seabirds are busy feeding; they don't return to the nest until night. But whose nest was it? Storm petrels, puffins and ancient murrelets, among other seabirds, also nest in burrows.

Ebbert and Slater first tried a physical examination. Says Ebbert, "I had to hang onto my partner's legs while she leaned over and stuck her hands as far as she could into the burrows to get some clue what was using them." No luck.

Next they tried a motion-activated camera, placed near the burrow entrances. Something tripped the shutter six times during the night. When Ebbert and Slater had the film developed soon after their return from the field, the subject was plainly visible in two of the six exposures: a rhino auklet.

"This is good news," says Ebbert. "Sometimes, an invasive species will totally eliminate native species from an island and keep them off, as foxes did with Aleutian geese. But often a few holdouts will hang on in remote, inaccessible places. I think that's the case with the rhino auklet. The only reason they're nesting where they are is so the marmots can't get them."

Ebbert is hopeful the seabirds will return in greater numbers: "Once we remove marmots from the island, maybe we'll start to see auklets nesting in other areas."

Susan Morse is a writer/editor in the Refuge System Branch of Communications.

Focus. . .Citizen Science

Hail Cove Living Shoreline Restoration

Students spent a cold, windy day planting high marsh grass along the shoreline of Hail Cove at Eastern Neck National Wildlife Refuge, MD. (Jennifer Greiner/USFWS)

Take one group of eager elementary schoolchildren buffeted by cold winds. Add a few community volunteers willing to spend two years raising oysters from spat. Fold in expertise from Maryland's Eastern Neck National Wildlife Refuge, Washington College's Center for Environment & Society, Ducks Unlimited, the National Aquarium and the U.S. Fish and Wildlife Service's Chesapeake Bay Field Office.

The result? A restored and living shoreline at the refuge's Hail Cove that has engaged community residents and provided habitat for striped bass, waterfowl, blue crabs, mussels and oysters.

The shoreline surrounding Hail Point and upstream at Hail Cove had eroded by nearly 1,000 feet over the past 100 years. A living shoreline project not only gave citizens a chance to contribute to habitat restoration in the cove, but also demonstrated new techniques for stabilizing river banks and improving wildlife habitat.

In September 2009, students from Rock Hall Elementary School spent a cold, windy day planting high marsh grass along the shoreline of the cove. "The kids were tough and gung ho," says David Sutherland, coastal program leader in the Chesapeake Bay Field Office, "and the plants are holding their own. Marsh birds will feed there, and white perch, striped bass and river herring will most likely use the habitat in greater numbers."

Sutherland says this is a great improvement over traditional shoreline restoration with stone armoring of the entire shoreline or bulkheading with boards lined up to stop erosion along a bank. Neither of these traditional remedies restores habitat. Sutherland says the Maryland Department of Natural Resources, with new legislation on "living shorelines," passed in 2007, and the Service are leading the way with new restoration techniques.

Raising Oyster Spat in Your Spare Time

Meanwhile, the Friends of Eastern Neck – which has longstanding ties to Washington College's Center for Environment & Society (CES) – had provided a grant in 2007 for an oyster restoration project. The center hosted public workshops and recruited 16 waterfront families willing to build floats and raise oysters for two years. When the spat matured, 20 bushels of oysters were provided to the shoreline restoration project.

An arc of stone was created to connect two breakwaters, with a layer of stone and a layer of oysters in select areas as a pilot study. Raising oysters one to two feet off the bottom provides maximum circulation and survival, explained Sutherland, who said the "oysters appear healthy and happy … and after a few weeks, we photographed blue crabs and fish using the shallow water habitat."

Oysters not only have an economic value for the region but are also important to cleaning and filtering the waters of the bay. "The families who volunteered to raise oysters," said JoAnn Fairchild, senior program manager at CES, "were already concerned about water quality and wanted to do something. Did the oysters improve water quality? No, but the oysters are symbolic of stewardship efforts along the Chester River. And they contributed to the benthic habitat at Hail Cove."

Fairchild says the center is working to engage new families willing to take oyster spat in the spring, while some of the existing families want to begin growing submerged aquatic vegetation. Mark Wiest, a 2005 Washington College graduate hired as the oyster stewardship coordinator, said that "engaging community members in small-scale aquaculture is just one of the many strategies that need to be instituted in the bay to restore oyster populations … Establishing a sense of place is a key component of instituting the large-scale behavior change that will be necessary to preserve the bay for future generations."

The Hail Cove living shoreline restoration project cost $650,000, with a third contributed by Eastern Neck Refuge. Other significant funders were companies with the Maryland Corporate

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Army of Citizen Scientists Observe Subtle Changes

By Mary Tillotson

The United States is such a vast and varied country, it would take an army of scientists to observe and record the subtle changes in plant and animal life that mark the changing seasons and changes – over time – in the climate.

So professionals at the National Center for Atmospheric Research (NCAR) in Boulder, CO, and the Chicago Botanic Garden (CBG) are enlisting what they hope will be an army of citizen scientists to help gather that data. The program is called Project BudBurst, in which the Refuge System is participating.

Project BudBurst director Sandra Henderson says that in its first two full years of operation, thousands of volunteers from all 50 states have registered at the project's Web site to keep a weather eye on native plants across the country.

More than half a dozen refuges are interested in being part of the project and the staff at two – Neal Smith National Wildlife Refuge, IA, and Bosque del Apache National Wildlife Refuge, NM – are actively making plans to have volunteers begin gathering data this summer.

NCAR and CBG want those volunteers to record different stages in the budding/flowering/fruiting process of various plants. That sort of data is the raw material of phenology – the study of cyclic natural phenomena – and how the timing of such biological events as flowering, migration and hibernation, reflect changes in season and climate.

Project BudBurst has initially targeted for observation 75 trees, shrubs, wildflowers and grasses native to their respective regions. Perfectly matched with the Refuge System's emphasis on restoring and protecting native species, the project also encompasses numerous ecosystems in the U.S. That makes the Refuge System an ideal agency for gathering phenological information about the country as a whole, says Henderson. She predicts the information gathered on refuges will be "a tremendous boon to phenologists."

For example, staff and volunteers at Neal Smith Refuge are restoring thousands of acres to the tallgrass prairie/oak savannah ecosystem that existed in Iowa before European settlers flocked there to farm in the mid-1800s. Refuge biologist Pauline Drobney says that, so far, 3,000 acres are planted and in various stages of development. Several of the grasses and plants used in the prairie restoration, including big blue-stem grass, a major tallgrass, and blue-eyed grass, a spring wildflower, will be on the Project BudBurst list for observation.

Years of Data Collection

The refuge staff is working to finalize the specific plants to be studied and the methodology volunteers will use to record seasonal changes of those plants. Drobney herself is interested in what information Project BudBurst may produce. In the last year, she says, big blue-stem, wild quinine and indigo on the refuge bloomed a month early, and the indigo kept blooming all summer. "Lots of plants were going through phenological changes I couldn't explain," she says. Project BudBurst may start offering explanations.

Big blue-stem grass – being restored at Neal Smith National Wildlife Refuge, IA – is just one of the 75 species of trees, shrubs, wildflowers and grasses being followed by citizen scientists for Project BudBurst. (Project BudBurst)

Both Drobney and Henderson know that any credible suppositions about climate change will take years of collecting data, not just information gleaned from one growing season.

Drobney says she hopes the methodology for Project BudBurst will be adopted by other refuges and other organizations interested in tracking evidence of climate change. She also hopes Project BudBurst will become an expanding and permanent part of the Refuge System's role in protecting the environment. Discernable changes in climate, after all, occur over decades and centuries, not over a few years.

An important side benefit of Project BudBurst, Drobney says, is that it engages private citizens in observing that changes in climate can produce changes in wildlife. If an unusually hot, dry season decimates such pollinators as bees, and if that factor then affects the viability of natural communities and reduces food production, it's important, says Drobney, that citizen scientists record and begin to understand the relationship. Public awareness of how interrelated nature and climate are to our own way of life matters to us all.

For more information about Project BudBurst or to register your refuge, go to: www.windows.ucar.edu/citizen_science/budburst/.

Mary Tillotson is a career journalist who formerly worked for the Refuge System Branch of Communications.

Scientists of All Ages

From leaf litter to groundwater to Blanding's turtles, students from elementary school through high school are actively collecting scientific data and contributing to wildlife restoration. Projects at Sevilleta National Wildlife Refuge, NM, and Assabet River National Wildlife Refuge, MA, are longstanding and expanding.

Sevilleta Refuge is managed primarily as a research area and is closed to most recreational uses. However, one site is used by the Bosque Ecosystem Monitoring Program (BEMP), an ecological monitoring program that has involved teachers and students in the Middle Rio Grande riparian forest, or "bosque," for more than a decade. BEMP has 25 sites – including Sevilleta Refuge – and more than 2,500 students from more than 40 schools participating in field data collection, lab processing and follow-up study.

The Sevilleta Refuge site was first used by homeschoolers in 2003. Now fifth graders from Cottonwood Valley Charter School collect data used by researchers at the University of New Mexico (UNM). The students measure the shallow groundwater table with two precipitation gauges. They also collect leaf litter.

"Since we've started the Blanding's turtle project, I've been much more aware of how people my age can have an impact on wildlife and the environment."

Lynsey Neilan, 10th grade

Students in the Bosque Ecosystem Monitoring Program measure the groundwater table and collect leaf litter at Sevilleta National Wildlife Refuge, NM. (BEMP)

Using field site maps, the students work in teams to locate the tubs that have filled with leaf litter, write field journals, identify native and exotic plants and weigh their collections in grams. Then the material is turned over to UNM researchers; UNM college students serve as mentors for the youngsters. In what may be the most fun for certain youngsters, students also set small traps for arthropods that are collected, frozen and provided to UNM entymologists.

"This is real data. Accuracy, precision and honesty are important," explains Kimi Sheerer, BEMP education coordinator. "For the first five years, the community said, 'OK – you have a nice little program.' Now we are collecting data along 140 miles of the Rio Grande, which are the framework for additional research."

Kim Eichhorst, a UNM biologist, says BEMP data are used by a variety of government agencies. "Sevilleta Refuge is a great comparison site because of its unique groundwater chemistry compared to our other sites in the Middle Rio Grand Valley." She says data collected by students are being used to track possible declines in native cottonwoods and increases in saltgrass.

Raising Turtles

On the other side of the country, students at Bristol County Agricultural High School in Massachusetts are raising turtle hatchlings from Oxbow National Wildlife Refuge for relocation to Assabet River Refuge. Brian Bastarche, who teaches a variety of biology and natural resources management courses, wanted to excite his students about wildlife conservation while making a tangible difference in the conservation of a local rare species.

Enter the Blanding's turtles, a listed species in 15 states and three Canadian provinces. These turtles don't produce until they are about 15 years old, and they need to be able to move between upland and wetland habitat. Fragmented habitat is a problem.

Students in Massachusetts are raising Blanding's turtle hatchlings for relocation to Assabet River National Wildlife Refuge. (Brian Bastarche)

Assabet River Refuge wildlife biologist Stephanie Koch says "head-started" turtles raised in captivity for their first year are less vulnerable to predation and more likely to survive their second year of life in the wild.

So students are head-starting some of the hatchlings in a well-equipped lab at the school where they regularly measure, weigh and monitor the turtles. "The best part is when we see how they have grown since we received them," says student Ashley Costa. "And we know that a bunch of teenagers is in charge of such an important project," adds Kelly Coakley.

Since the fall of 2007, Assabet River Refuge has received 80 "direct-released" hatchlings and 61 "head-started" hatchlings. The 50 hatchlings being raised at Bristol County Agricultural High School will be released at Assabet River Refuge next spring.

Bryan Windmiller, a private researcher, has expanded school participation to four other schools, including middle and elementary school students. Raising the hatchlings "gives students a sense of empowerment" and "combats the sense of helplessness that we all tend to feel when confronted with large, abstract environmental problems."

"This is worthwhile not just because of a grade. We're actually helping this species."

Katie Barboza, 10th grade

One group of the students even discovered an extremely cold and tiny hatchling at Great Meadows National Wildlife Refuge, MA, that showed signs of movement only when it was in a student's warm hand.

Named Lucky by the students, the hatchling now "qualifies as the spunkiest turtle I have met," says Windmiller. "I am quite certain that some of the students are developing a sense of connection and stewardship with wildlife that will last them a long time."

Hail Cove Living Shoreline Restoration — *continued from page 8*

Wetlands Restoration Partnership – Vulcan Materials, Constellation Energy and Brick Company. Grants were also awarded by the Chesapeake Bay Trust, Fish America Foundation and the North American Wetlands Conservation Act. The Service's Coastal Program, refuge and field office staffs are monitoring fish and wildlife along the newly restored shoreline habitat and seeking funding to expand the oyster reef restoration.

"The best part of this is the creation and restoration of shallow water habitat," says Sutherland. "Before the oysters were decimated by disease and commercial take, the oyster beds were magical ecosystems for fisheries production and shoreline protection."

Now with the help of a wide range of community residents, the first steps are being taken to re-create one of the "finest recreational fishing areas in the Chester River."

Greater Noxubee Wildlife Management Cooperative

By Len Deibert

Building on the model of wildlife management cooperatives elsewhere in the country, the 48,000-acre Noxubee National Wildlife Refuge in northeastern Mississippi is crafting what may well be the largest public-private cooperative in the South.

Wildlife management cooperatives – often focused on conserving and managing game animals – are collections of neighboring landowners who formally and voluntarily agree to work together. In Texas, for example, landowners have joined cooperatives for enhanced hunting, birdwatching or fishing; others just wanted to improve their local environments. Cooperatives vary in size, number of participants and organizational structure.

National wildlife refuges in several states participate in cooperatives. In South Carolina, for example, the Ernest F. Hollings ACE Basin National Wildlife Refuge is part of a successful deer management cooperative. The Grasslands Wildlife Management Area in California's San Joaquin Valley is part of the Grasslands Water District, formed by landowners who want to conserve waterfowl.

Though still in its infancy, the Greater Noxubee Wildlife Management Cooperative (GNWMC) dwarfs many cooperatives. Already grown to 146,000 acres, the cooperative has a goal of 226,000 acres, according to Noxubee Refuge manager Henry R. Sansing. "The more conservation activities we do as a group, the greater our conservation footprint will become," Sansing says. Members of the cooperative include the Noxubee Refuge, Mississippi State University, the Mississippi Department of Wildlife, Fisheries and Parks, national and state forests, timber companies, the Quality Deer Management Association, Quail Unlimited, the U.S. Fish and Wildlife Service, Friends of Noxubee, and private landowners neighboring Noxubee Refuge.

The GNWMC was founded in April 2008 as a voluntary partnership of private and public landowners committed "to maximizing landscape level conservation while enhancing wildlife habitat, hunting opportunities and stakeholder relationships."

Sansing has already identified specific results from the cooperative's work: "Quality habitat, people working together…increased communication across property boundaries, information transfer on game and invasive species, launching of cogongrass control, increased deer harvest data collection, and more recognition of wildlife refuges and the Service as innovative leaders in conservation."

Building Trust

When building a larger grassroots conservation footprint, Sansing says, "You've first got to build relationships and trust. When you have that, you can then move on to even bigger projects."

The 50,000-member Quality Deer Management Association (QDMA) joined the cooperative after being involved in smaller projects with private landowners, but its participation with the Noxubee coop is its first involvement with federal or state lands. QDMA chief executive officer/wildlife biologist Brian Murphy believes "cooperatives are the future of wildlife management. If we don't reach out to private landowners, we will lose the battle."

Leaders of the Greater Noxubee Wildlife Management Cooperative hope it will serve as a model for cooperatives involving other national wildlife refuges and their neighbors across the nation. (Marion Sansing)

Murphy says Noxubee Refuge "has a manager who gets it…The Noxubee cooperative is a great model." Like Sansing, QDMA is interested in increasing cooperative acreage to as many participants as possible. QDMA founder Joe Hamilton, a veteran of 30 years as a wildlife biologist, says cooperatives breed good neighbors and result in enhanced management of all wildlife species and their habitats.

Murphy says the cooperative "transforms the landowner and the hunter from consumer/observer to manager. For a lot of hunters, it broadens their perspective. It's knowledge gained to accomplish something bigger than self."

Craig Foster is a deer hunter and president of the Dancing Rabbit Hunting Club, located on land bordering Noxubee Refuge. As a member of the cooperative steering committee, Foster can testify firsthand to the value of the GNWMC. He says he has been impressed not only by learning about Mississippi's deer management programs, but also by the importance of being "a good steward of the land and a big advocate for land management."

While the idea for the cooperative originated with the refuge, the steering committee also recognizes the increased need for local participants to take ownership. The cooperative faces a series of challenges, including the lack of a perceived crisis, identifying balanced and diverse participants, and maintaining communication among members. Nonetheless, leaders of the Greater Noxubee Wildlife Management Cooperative hope it will serve as a model for future endeavors.

Len Deibert is a veteran journalist in Washington, DC.

Eyes and Ears Across the U.S.

"I never knew pigeons came in so many colors."

"Where have all the warblers gone?"

"Our research tells us that we see more mourning doves than other kinds of birds because they like what we offer."

The questioners and researchers are all citizens observing and recording natural events, including fourth graders participating in a Cornell Lab of Ornithology project called BirdSleuth. The Cornell Lab coordinates 11 bird-related citizen science projects, some of which have been collecting data for more than a decade. In 2008, the U.S. Fish and Wildlife Service signed a Memorandum of Understanding with Cornell Lab to promote birding, habitat conservation and citizen science to a broad audience across the country.

The Illinois fourth graders whose feeders attracted mourning doves also observed that the birds used the "birdbath to wash their beautiful feathers in … and sand and gravel from our playground." Their observations are recorded in short, journal-style articles complete with graphs and illustrations in the *Classroom BirdScope*, a newspaper distributed to participating classrooms.

Getting Excited about Conservation

Washington Maritime National Wildlife Refuge Complex has participated for a decade in Project FeederWatch, a winter-long survey of birds that visit feeders at backyards, nature centers, community areas – or national wildlife refuges. Feeders are set up near a caretaker cabin on a sand spit next to Dungeness Bay. A few volunteers record the species that use the feeder for two hours on specific days.

"The volunteers like the fact that you never know what's going to show up," says deputy project leader Lorenz Sollmann. "That degree of unexpectedness is part of the excitement as well as the camaraderie." Sollmann enters the data gathered by the volunteers into a national online database managed by Cornell Lab.

Project FeederWatch is a winter-long survey of birds that visit feeders at backyards, nature centers, community areas – or national wildlife refuges. (Rainer Hungershausen)

In the fall of 2009, Oregon Coast National Wildlife Refuge Complex started a Project FeederWatch in tandem with the Bandon Public Library. "At the library, we're providing the feeders and food throughout the winter, and there are nice big windows and comfy seating for observers," says the refuge's AmeriCorps volunteer Kelly Balcarczyk. "The community gets hands-on experience in data collection, which connects them with wildlife and gets them excited about conservation issues."

The validity of citizen science data is in its abundance, says Karen Purcell, Cornell Lab project leader for two other endeavors, Project PigeonWatch and Celebrate Urban Birds. She works with community-based organizations to spark an active interest in science, especially in diverse communities. "The beauty of citizen science . . . is noticing where we see birds, where are they changing. It becomes more important as we face climate change challenges because people notice and participate in inquiry themselves," says Purcell.

The Cornell Lab provides mini-grants, curriculum kits and information packets for its citizen science projects, as well as a Citizen Science Central database of projects.

For more information, go to:
Citizen Science Central
www.birds.cornell.edu/citscitoolkit or

Cornell Lab of Ornithology Citizen Science Projects
www.birds.cornell.edu/netcommunity/citsci/project.

Around the Refuge System

Minnesota

Visitors to the Wildlife Drive at Sherburne National Wildlife Refuge may now step inside a life-size model of an eagle's nest. Refuge staff led a summer crew of Youth Conservation Corps enrollees, college interns and firefighters who built an octagon-shaped deck and access ramp. Eleven refuge volunteers collected more than 1,000 sticks, attached them to the rails and wove them together to simulate a nest. Three interpretive panels covering the bald eagle's life, nest and food were added.

A nearby observation deck includes two permanent spotting scopes for viewing wildlife, including an active bald eagle nest. The Friends of Sherburne provided a bench for the site with memorial funds for Lloyd Podtburg, an avid refuge visitor fond of watching bald eagles. Sherburne Refuge, along with Whittlesey Creek, Rice Lake and Crane Meadows National Wildlife Refuges won a contest presented during the Region 3 Visitor Services Workshop in June 2007. The four refuges split the $30,000 prize provided by the regional office, each using $7,500 to create a discovery area that would enhance the refuge experience for children.

A life-size simulated eagle nest has been built near the Wildlife Drive at Sherburne National Wildlife Refuge. (Lee Johnson)

Native Alaskan elder Nick Lekanof led the way to a graveyard in the village where he was born, now part of the Alaska Maritime National Wildlife Refuge. (National Park Service)

Alaska

In the summer of 1942, four Unangan Aleut villages disappeared. Following the Japanese attack on Dutch Harbor, and the invasion of Attu and Kiska, U.S. authorities evacuated the native people of the Aleutian Islands and took them to evacuation camps in southeast Alaska. The Attuans, after the occupation of their island, were taken to Japan as prisoners of war. The Unangan Aleut communities lost 25 percent to 40 percent of their people in three years due to the poor conditions in the evacuation camps. In a final blow, the survivors from several villages were not allowed to return home. The U.S. Fish and Wildlife Service, the National Park Service and the Ounalashka Corp. are researching four of the villages on islands that are now part of Alaska Maritime National Wildlife Refuge. These partners are producing a book and an exhibit that will travel throughout the throughout the Aleutian and Pribilof regions.

As part of the research, the Service vessel *M/V Tiglax* carried several native Alaskan elders to one of the villages last fall. Elder Nick Lekanof visited his childhood home in Makushin and told family members and researchers about life in the small community where he was born. Nothing remains of the village now except the collapsed remains of a church and scattered headstones. A small group of family members erected a Russian Orthodox cross and cleared vegetation from several graves.

Maine

Mazel tov! Thirteen-year-old Noah Lanckton of Brookline, MA, celebrated his Bar Mitzvah by asking guests to donate to Rachel Carson National Wildlife Refuge rather than give him gifts. Noah spent summers in Maine with his grandparents, getting to know the marshes of Rachel Carson Refuge. Noah donated $940 to the refuge.

Park Ranger Karrie Schwaab said the funds would be used to build awareness about the New England cottontail, endangered in Maine and a candidate for federal listing. She said guests at a recent wedding on the refuge gave donations rather than gifts, but this is the first donation from someone as young as Noah.

Noah Lanckton raised $940 for Rachel Carson National Wildlife Refuge, ME, as part of his Bar Mitzvah celebration. (Alisa Lincoln)

Florida

More than 130 visitors welcomed the grand opening of a canoe launch, parking lot and boardwalk to the Marsh Trail at Ten Thousand Islands National Wildlife Refuge. The grand opening in October 2009 was especially significant

since the refuge had been accessible almost exclusively by water due to a lack of safe parking. The parking area now allows easy access and safe parking year-round for the public to enjoy wildlife observation, non-motorized boating, fishing, waterfowl hunting and hiking. The refuge and the Refuge Roads Program each contributed about $200,000 for the project and the Florida Department of Transportation provided $767,000.

New Mexico

A photography exhibit organized by the Friends of the Bosque del Apache National Wildlife Refuge featured 26 photos all taken on a single day by photographer Joe Roybal. "One Day in May at Bosque del Apache" was exhibited on the campus of New Mexico Tech last fall. Like many visitors, Roybal had discovered that some of the most enchanted moments at Bosque del Apache Refuge occur outside the heavily-visited winter months. In less than six hours, he photographed 17 bird, mammal and amphibian species.

Roybal took his first photo at the refuge [illegible] with a Kodak Instamatic camera. He has been photographing at Bosque ever since. The photos taken on May 29, 2009, were the centerpiece of a larger exhibit of Roybal's off-season Bosque photos, "confirming that Bosque del Apache is indeed a refuge for all seasons," said exhibit producer and Friends member John Bertrand.

Virginia

A 3,400-square-foot 1970s beach house is about to become the administrative headquarters for Back Bay National Wildlife Refuge. Every room overlooks Asheville Creek, many through floor-to-ceiling windows. The building was originally designed as a home by local architect Lewis Rightmeier, who is known for designing homes integrated with the landscape.

When renovations are completed in February, the house will also have geothermal heating and cooling, energy efficient windows and cork flooring. The home is being renovated with $528,000 from the American Recovery and Reinvestment Act and will serve as the "Gateway to the Sandbridge Area," with access to the refuge as well as Little Island City Park and False Cape State Park, a primitive area adjacent to the refuge's southern border.

A distinctive 3,400-square-foot 1970s beach house is about to become the administrative headquarters for Back Bay National Wildlife Refuge. (Greg Owens/USFWS)

New York

At Wertheim National Wildlife Refuge on Long Island, a cluster of Native American camping sites was discovered during the archaeological survey for a new visitor center, as required by the National Historic Preservation Act. "As this visitor center location was on a nice level piece of ground overlooking wetlands, we knew that it was a likely spot for a Native American site," said Northeast regional archaeologist John Wilson. As expected, a cluster of camping areas was found, occupied between 8,000 and 400 years ago.

Wilson says the biggest surprise was that the land was never tilled, "so the locations of individual artifacts and features like campfire pits are pretty much just the way they were when people pulled up stakes and moved on. A careful archaeological excavation of the site would tell us more about what people were doing during various time periods." The visitor center design was altered to preserve the archaeological site for potential further study. "Due to the development pressure on Long Island," said Wilson, "fewer and fewer sites on non-federal land are being preserved, so the value of saving this site can only increase as time passes."

This photograph of a roadrunner was one of 26 photos in an exhibit entitled "One Day in May at Bosque del Apache." (Joe Roybal)

Protected Stopovers Help Restore Shorebirds

By Katie Iaquinto

Tens of thousands of shorebirds – more than 20 species – rely on Monomoy National Wildlife Refuge, MA, and surrounding Cape Cod beaches during their north-south migration, but most importantly during their southward migration. In September 2009, Monomoy Refuge staff concluded the first year of a collaborative project to investigate the health of migrating shorebirds around Chatham, MA.

Many of the species have been identified as high priority for live bird sampling for highly pathogenic avian influenza (HPAI, avian flu) in the Atlantic Flyway. Refuge staff captured and banded red knots and other shorebirds that utilize the refuge as a stopover.

Early in the planning process, Monomoy Refuge staff decided to collaborate with Lawrence Niles of Conserve Wildlife Foundation of New Jersey, who had already studied red knots in the Arctic and Tierra del Fuego. With Niles' assistance, refuge staff learned to cannon-net shorebirds. Nets are pulled rapidly by explosive-driven projectiles to cover a large area and capture as many birds as possible. A cannon-net may use four or cannons to pull a net over the target area. Cannon-netting requires an experienced team not only to coordinate and manage the catch itself, but also to care for the birds so they can be released safely.

The team included Brian Harrington, a senior scientist of the Manomet Center for Conservation Sciences, who had documented changes in red knot foraging and roosting areas throughout southeastern Massachusetts. Harrington's observations as well as his knowledge of red knot roosting ecology largely informed the daily decision of where to target netting efforts.

A Successful Catch

Shorebirds were trapped using two cannon nets at three sites in Chatham, which included state, town and federal property, greatly expanding local partnerships. The project was completed during eight days of field work, and included many volunteers and staff from the Eastern Massachusetts National Wildlife Refuge Complex. The largest catch took place on Minimoy Island, part of Monomoy Refuge, and included 135 red knots, four black-bellied plovers and one short-billed dowitcher. The catch met goals for the number of birds; no birds were killed or seriously injured.

More than 130 red knots and other shorebirds were banded at Monomoy National Wildlife Refuge, MA, last fall in an effort to learn more about their health and the way they use the refuge. (Molly Cornell)

All captured birds were banded; most were sampled for HPAI, which was not present. By banding the birds, the refuge is able to follow them throughout their lifespan and learn more about how they use the refuge. Data from red knots outfitted with geolocators will be interpreted when the individuals are recaptured next year by the Conserve Wildlife Foundation. This is the first time these relatively new devices have been used on red knots at Monomoy Refuge.

Niles is hopeful that the research will bolster evidence regarding the importance of Monomoy Refuge and the surrounding area for southbound shorebirds. "I felt privileged to work in the wilderness of Monomoy Refuge and the surrounding islands in Chatham, one of the few protected stopovers for shorebirds during their southbound flight," said Niles. "This research builds on the growing base of data, which points to the National Wildlife Refuge System as an anchor for the protection of red knots and other declining shorebirds. Once, refuges played a crucial role in the restoration of waterfowl. Now, they are playing a similar role in the restoration of shorebird populations."

Katie Iaquinto is a biological technical at Monomoy National Wildlife Refuge, MA.

Seeking a Broader Perspective

By Jena Moon

Leadership in the wildlife field involves not only hard work and dedication, but also collaboration, listening and learning – and often learning by trial-and-error. Adaptive management decisions, after all, are based on those trials.

The Wildlife Society's Leadership Institute, which I attended from May to September 2009 as a Refuge System representative, reminds participants that being a good leader requires excellent interpersonal and communication skills and also a keen eye for ecological issues. While the keen eye may be intuitive for many biologists, the Leadership Institute improved my ability to recognize ecological issues as they resonate with varied constituents, including landowners, state and local agencies, nonprofits and academic institutions.

I am better able to communicate ecological problems, especially one issue that is critical to McFadden National Wildlife Refuge: the Intracoastal Waterway and how it has isolated a 40,000-acre portion of the Salt Bayou watershed. The watershed is shared by the U.S. Fish and Wildlife Service, the state of Texas and several private landowners.

As part of the Leadership Institute and The Wildlife Society's *Celebrating Our Wildlife Conservation Heritage* program, I was able to interview Charles Stutzenbaker – Stutz as he is almost always called – a retired state biologist who had spent much of his career trying to reestablish water flows south of the Intracoastal Waterway. He is an amazing wealth of knowledge regarding McFaddin Refuge, and he still provides input and advice on landscape level habitat projects and mottled duck efforts. During our conversations, he pointed out that today's ecological challenges are very similar to, if not the same as, biologists faced in the past. And as in the past, the problems are neither easy nor cheap to fix.

On McFadden Refuge, I am working with the Salt Bayou Technical Group, local drainage districts, private landowners and Texas Parks and Wildlife Department employees as we try to implement many management actions identified by Stutz, including restoring the Salt Bayou Watershed and mitigating for the Army Corps of Engineers' installation of the Intracoastal Waterway. Problems identified by Stutz in the '70s and '80s are now full blown ecological problems that have slow but persistent effects on coastal marshes – effects elevated in recent years due to storm surges and other damages from Hurricanes Rita and Ike.

Personal, Professional Reflection

The Leadership Institute offers information on different leadership strategies and great opportunities to network with other professionals. The 15 Leadership Institute participants included people from state game and natural resource agencies, the Universities of Florida and Arizona and the Confederated Salish and Kootenai Tribes. The program is especially good for recently graduated professionals who are still determining the direction of their careers.

Wildlife biologist Jena Moon, from McFaddin and Texas Point National Wildlife Refuges, TX, participated in a Leadership Institute offered by The Wildlife Society. (Ellen Stutzenbaker)

During my time at the institute, I also worked with The Wildlife Society working group on climate change. Sea Level Affecting Marshes Models (SLAMM) predict that by 2100 McFaddin and Texas Point Refuges will be completely submerged. McFaddin Refuge is already experiencing shoreline erosion as high as 60 feet per year. I recommended to The Wildlife Society Council that interested parties share information in an organized way online and gather for a conference every three to five years to identify creative funding mechanisms to help on-the-ground managers complete climate change projects in a timely manner.

The Leadership Institute offers a chance for deep personal and professional reflection. Other leadership courses offered in the Service also offer such opportunities, but for young professionals just contemplating leadership options, the Leadership Institute is one to seriously consider.

Application deadline for the next Leadership Institute is March 1, 2010. Forms available at http://joomla.wildlife.org/leadershipinstitute.

Jena Moon is a wildlife biologist at McFaddin and Texas Point National Wildlife Refuges. TX.

Leaders on the Move

By Noah Kahn

Former refuge supervisor and long-time Refuge System employee Don Hultman knows the secret to keeping the Refuge System's wheels turning and always driving forward: attracting and keeping good people.

"Employees will continue to create the Refuge System of the future … " Hultman said in a *Refuge Update* article last summer, after retiring from an accomplished career of nearly 30 years, "and we need to identify and nurture emerging leaders [and] … urge [them] to move around to gain experience and insight by taking positions in the regional offices and in Washington." In other words, make sure the right people are in the right place at the right time. In bureaucratic speak, it's called "workforce planning."

From detailed personnel analyses to broad workforce goals articulated in *Fulfilling the Promise,* the Refuge System has been engaged in workforce planning for years. But because the wave of retirements is building, the focus on workforce planning is about to intensify. Approximately 20 percent of employees are projected to retire within five years and nearly 45 percent within 10 years. In fact, if you're in a refuge office right now, look around – about 20 percent of your colleagues are warming up their retirement-bound moving trucks.

In coming months, Refuge System's top management will consider recommendations on the most pressing workforce issues, including leadership development programs, incentives for relocation, recruitment of qualified young people, and of course, the impact the retirement wave will leave in its wake. Because the Refuge System may well lose its most experienced people en masse, many people, including the Refuge System's leadership, are committed to strengthening programs that introduce young people to wildlife conservation careers.

Relocation. Incentives. Motivations. Last year, the Refuge System surveyed its employees to learn more about their attitudes on mobility and leadership development. About 1,100 employees – nearly a third of the Refuge System's employees – responded to the survey, conducted with help from consultant Steve McMullins of Virginia Tech.

Approximately 20 percent of Refuge System employees are projected to retire within five years and nearly 45 percent within 10 years. (Steve Hillebrand)

There is an unwritten but widely accepted rule that rising to senior leadership positions within the Refuge System requires time spent in a variety of jobs and locations to get the right kinds of experience. But frequent moves can be disruptive to a spouse's career, children's schooling, or preferred lifestyles. So the survey tried to get to the bottom of a series of assumptions:

- **Assumption:** Employees aren't willing to move as often as they used to.

- **Survey Says:** Relocation rates did not significantly decline in 2000-2009 as compared to the previous decade. Indeed, 80 percent of employees said they are willing to relocate at least once to achieve career goals; 52 percent would relocate at least twice. Approximately 16 percent of employees will consider moving to the Washington Office, compared to 35 percent who will consider a regional office and 68 percent who would move to a refuge.

- **Assumption:** Employees view relocation as a means for promotion or as necessary for leadership development.

- **Survey Says:** "Interest in a promotion," the "desire to diversify experience" and the "desire to contribute more to the mission of the Refuge System" were the top three reasons given by people willing to move. Those who have participated in Stepping Up To Leadership or Advanced Leadership Development Program relocate at significantly higher rates than those who have not participated.

- **Assumption:** Employees are interested in the establishment of leadership positions in locations other than current regional offices or the Washington Office.

- **Survey Says:** Approximately 45 percent of employees believe that establishing regional or national leadership positions outside major urban areas would be "very effective" for encouraging leadership development.

- **Assumption:** Employees favor short-term details (one to three months) as the preferred way to develop leadership skills.

- **Survey Says:** Employees willing to move four to five times are much more likely to view long-term details (12 months or more) as "highly effective" than those who are less willing to move. Compared to veterans with more than 20 years on the job, employees with less than 10 years are much more likely to favor short-term details.

For complete survey results, go to: www.fws.gov/refuges/policiesandbudget/NWRSWorkforcePlanning.html.

For more information about leadership development and career planning, visit: www.fws.gov/refuges/about/careerResources.html.

Noah Kahn is the performance manager for the National Wildlife Refuge System.

Whatever Happened to….
Oyster Shells, Mangroves and Cordgrass

"We're beginning to see the return of wading birds and shorebirds," says manager Charlie Pelizza at Pelican Island National Wildlife Refuge, FL. "The trend is in the right direction." The trend is also in the right direction for the island itself – it is growing.

For the past decade, three phases of restoration have tried to repair 100 years of damage to the island caused by natural wave action and boat wakes. In 1999, cordgrass was planted around the island but the project was too labor intensive and the plants did not survive. In 2001, shell rock, gravel and sand were dropped by helicopter, expanding the island from 2.3 to 2.8 acres. It was 5 1/2 acres when President Theodore Roosevelt established this first national wildlife refuge in 1903.

Brown pelicans and other waterbirds are beginning to thrive on Pelican Island again. (John Turner/ USFWS)

In 2006, 250 tons of shells were dropped by helicopter into the Indian River Lagoon forming a shellbed around the island. *(See Refuge Update March April 2006.)* Newly planted cordgrass is surviving and the island is now up to 3.2 acres. "We're trying to mimic the natural cycle of establishing cordgrass in shallow water, then allowing the cordgrass to entrap mangrove seeds and establish mangroves along the shoreline. We're just waiting now for these natural processes to take hold," says Pelizza.

The refuge is partnering with the Indian River Lagoon National Estuary Program to study the restoration, including mapping beds of endangered Johnson's seagrass. In the meantime, waterbirds are beginning to thrive on the island again. "We had five brown pelicans nesting this past year," said Pelizza, "as well as five double-crested cormorants and five great blue herons."

From the Director — *continued from page 2*

high scientific values that should also be considered for designation as wilderness. Some of the most pristine and intact ocean environments in the world are now included in the Refuge System.

Even with the daunting conservation challenges we face today, we must recognize that protected areas will remain a central part of any conservation strategy. Wild life needs wild places. We must provide redundancy in protected areas; areas where we believe the ecosystem may be resistant to the effects of a changing climate should be protected as well.

The great conservationist Aldo Leopold described wilderness as a laboratory, "a base datum of normality, a picture of how healthy land maintains itself." As climate change and other stressors come to bear on these "healthy lands," wilderness can serve as an important laboratory for us to observe how the land, wildlife and ecological processes change.

The new frontier of conservation requires us to look at landscapes at all scales, including continental and hemispheric scales. Yet all conservation begins at the local level. Community support is essential. Refuge Friends groups, volunteers and other engaged citizens remain essential components of our wilderness efforts.

Wilderness stewardship serves as perhaps the most visible symbol of our generation's willingness to pass on some of America's treasured landscapes as we found them. Today, as we work together on the new frontiers of conservation in an ever-changing world, our stewardship of enduring wilderness is more important– and relevant than ever.

The Right Science in the Right Places — *continued from page 1*

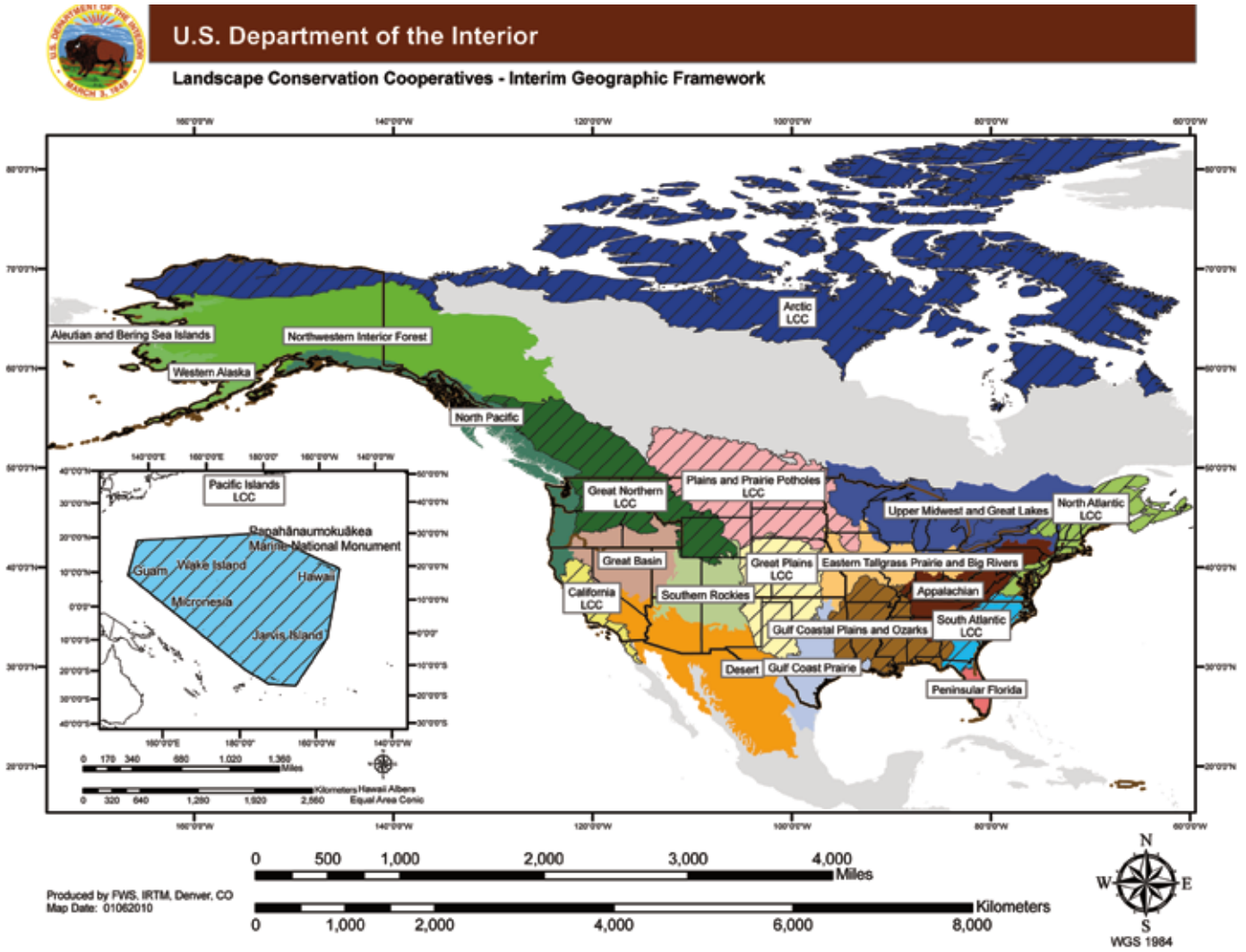
manager, this can include determining where to purchase easements or options for managing water resources on the landscape. Ultimately, LCCs help us live up to the expectations of the American public and fulfill our trust responsibility to sustain fish and wildlife populations in the face of climate change and other 21st-century resource threats."

With an initial federal investment of $25 million in this fiscal year and other funding sources, the Service and U.S. Geological Survey (USGS) are forming LCCs across the country serving the following geographic areas (see map): Pacific Islands, Great Plains, Plains and Prairie Potholes, South Atlantic, North Atlantic, Great Northern, California, Arctic, and Gulf Coastal Plains and Ozarks. Ashe says that during FY 2011 the Service and partners will work to establish another eight to 11 LCCs with the eventual goal of creating a "seamless national network" of 21 cooperatives by FY 2012.

The level of partnership engagement and commitment is encouraging. The National Park Service is committing support for several emerging LCCs, including the Pacific Islands, Great Northern, and South Atlantic. NOAA has committed support in the Pacific Islands. And the Bureau of Reclamation, Bureau of Land Management, U.S. Forest Service, Natural Resources Conservation Service, and others have expressed interest in contributing resources. In fact, partner interest could drive the establishment of several additional LCCs in FY 2010. For instance, the state of Florida has expressed interest in leading development of the Peninsular Florida LCC, and both the USGS and NPS have committed resources to that effort.

Ashe says Service regions already have been meeting with staff and external partners to identify LCC science needs and partnership opportunities. This includes identifying priority species and collecting ecological and scientific baseline data that will provide the foundation for developing the form, function, role, capacity and organization of LCCs in 2010 and beyond.

He expects most if not all FY 2010 LCCs will have staff in place (including LCC coordinators and science coordinators) and governance details ironed out by the end of the fiscal year on September 30,



The U.S. Fish and Wildlife Service and U.S. Geological Survey are forming landscape conservation cooperatives (LCCs) across the country. (Chris Lett/ USFWS)

LCCs will help manage landscapes capable of sustaining abundant, diverse and healthy populations of fish, wildlife and plants. (Robert Karges II)

2011. Though it may take a few years for the LCC network to be fully functional in terms of science capability and connectivity, Ashe says LCCs will begin providing scientific support to resource managers immediately, and that capacity will grow through 2011 and 2012.

Thinking Big

LCCs not only represent a more networked approach to conservation, but they also signal a new way of doing business.

Ashe says that during the past century, the conservation business model largely focused on protection, restoration and management. "Along with states and other partners, we've had great success with that approach, but the unprecedented pace and scale of climate change and other landscape-scale stressors have changed the game," he says. "Our conservation target – once as simple as protecting and managing parts and pieces–is now as complex as sustaining systems and functions, species and populations at global scales."

Ashe says LCCs embrace the idea that protection, restoration and management are not ends unto themselves. These activities, as well as applied science, are a means to a larger outcome – landscapes capable of sustaining abundant, diverse and healthy populations of fish, wildlife and plants.

"LCCs can transform and build on the work we're doing right now," he says. "The key difference is that our decisions will be tied to something bigger than what is in our own backyard."

Similarly, LCCs are redefining partnerships by promoting relationships that allow a region's private, state and federal conservation infrastructure to operate as a system rather than as independent entities.

Although Ashe says the Service will play key leadership and catalyst roles in developing each LCC by assisting in initial planning, partner coordination, assembling core staff and meeting associated needs for operational support, he says the cooperatives will be "partner-driven, not Service-driven."

Rather than create a new conservation infrastructure from the ground up, he says LCCs will build upon explicit biological management priorities and objectives, as well as science available from existing partnerships, such as fish habitat partnerships, migratory bird joint ventures and flyway councils, as well as species- and geographic-based partnerships.

Value Added

That's precisely what's happening in the Prairie Pothole Region of the northern Great Plains, where the Service's Midwest and Mountain-Prairie Regions are working with partners to establish the Plains and Prairie Potholes LCC.

According to the U.S. Global Change Research Program, climate change effects in the region, combined with other human-induced stresses such as cropland conversion and energy development, are likely to further increase the vulnerability of ecosystems to pests, invasive species and loss of native species. As a result, the region could lose up to 90 percent of its wetlands, reducing the number of the region's breeding ducks by as much as 69 percent, according to the Wildlife Management Institute report, "Season's End: Global Warming's Threat to Hunting and Fishing."

Lloyd Jones, project leader for Audubon National Wildlife Refuge Complex in North Dakota, says the Plains and Prairie Potholes LCC will leverage existing science capacity and partnerships to help conserve native wetlands and grasslands in the region.

Jones says the Service has many strong conservation partnerships within the area, including three migratory bird Joint Ventures and four Fish Habitat Partnerships. Existing Service science and strategic conservation planning capacity includes the Habitat and Population Evaluation Team (HAPET) offices in Fergus Falls, MN, and Bismarck, ND, the Fish and Wildlife Conservation Offices, the Fish Technology and Fish Health centers, and many national wildlife refuges, national fish hatcheries and ecological services field offices.

The region also has a solid history of collaboration with the USGS, which operates the Northern Prairie Wildlife Research Center and the South Dakota State University Cooperative Research Unit and is planning to establish an Intermountain West Regional Climate Change Hub.

"LCCs add value to what we already have," Jones says. "They can ramp up our level of understanding and scientific knowledge and help connect these efforts with the ultimate goal of conserving wetland and grassland resources."

Jones says refuge managers and field staff have an important role to play by providing essential feedback that will improve the LCC's ability to model and predict how landscapes and species will respond to a changing climate.

"We already have the manpower and expertise on the landscape to provide research and data through vehicles such as surveys and wildlife population counts that can be integrated into additional science and research done under LCCs," he says. "It's pretty exciting to think about how far we can go."

For more information on LCCs, visit www.fws.gov/science/shc/lcc.html.

David Eisenhauer is in the Office of Public Affairs, Washington, DC.

Cold-Stunned and Rescued

During 10 unseasonably frigid January days in Florida, 2,148 sea turtles were rescued from the waters of Merritt Island National Wildlife Refuge. The refuge sent out five or six airboats each day searching for turtles that had floated to the surface, 95 percent of which were endangered green sea turtles.

The turtles were trucked to a large maintenance shed at Merritt Island Refuge, where they were numbered, tagged, checked for disease and forwarded to any willing facility. One turtle filled a pickup truck and took four men to lift it. "There were turtles covering every inch of the floor of the shed," said supervisory ranger Dorn Whitmore, "from the size of a laptop, to the size of a desk." NASA even lent its huge space shuttle heater to the refuge on Florida's Atlantic coast.

Most of the turtles were returned to Merritt Island Refuge as soon as temperatures warmed. This is only the fifth time since 1977 that a turtle rescue has been necessary. The rescue procedure manual was last updated in 1992.

A massive rescue operation saved nearly all of the 2,148 cold-stunned sea turtles at Merritt Island National Wildlife Refuge, FL. (USFWS)

There was also a cold-weather turtle rescue at Pelican Island National Wildlife Refuge, FL, as well as a major fish kill and cold-stunning event at Hobe Sound National Wildlife Refuge.

Manatees Seek Warm Water

On the opposite coast of Florida, Three Sisters Springs near Crystal River National Wildlife Refuge became a haven for manatees seeking warmer water. On January 13, a record 641 manatees, including almost 100 calves, were counted from the Suwannee River to the Weeki Wachee River. The overwhelming majority of the manatees – 556 – was found in Kings Bay, which includes Three Sisters Springs.

"This points out the importance of preserving this area and managing this population in general," says Michael Lusk, manager of the Chassahowitza National Wildlife Refuge Complex, which includes Crystal River Refuge.

Chief's Corner — *continued from page 2*

nature to the millions of youngsters – and their parents – who live in high-density cities. Just consider a recent round of the television game show, *Jeopardy*, when none of the contestants could identify North America's tallest bird. At the time, I was with a group of Fish and Wildlife Service employees who blurted the question before that answer was read. We knew, but what does that tell us about America's natural resource education when three, obviously intelligent individuals were stumped by a "whooping crane" question? It made us all pause.

Second, we need to find and support more people like Katy and Susan to be mentors to young people, to teach them to camp, hike, fish, hunt, identify birds and be comfortable in nature. Your community may well be filled with people whose passion is the natural world – but they may not know it. As your new year's resolution, make it your business to bring them into the National Wildlife Refuge System fold. America's conservation future depends on it.

I'll see you in the field.

Priming Beetles for Battle

By Susan Morse

While the main growing season is now over across most of the country, a less visible but vital growing season is underway in northwestern Minnesota. At Tamarac National Wildlife Refuge, a new crop of natural enemies of pest plants is incubating for next season. Seedhead moths and knapweed root weevils, two host-specific insects that overwinter in the refuge's grass litter, help control invasive plants throughout the region. Two particularly nasty targets are spotted knapweed and leafy spurge, non-natives that have become widespread across Minnesota, Wisconsin and several western states.

For the past several years, the refuge has collaborated with federal and state agriculture experts to oversee production, collection and distribution of the plant hosts. On the refuge itself, upland birds that depend on native plants for nesting habitat have been among species to benefit as root-boring weevils have broken knapweed's chokehold by feeding on its roots and seed heads.

"We've seen very significant reductions in spotted knapweed over the past 15 years – in the vicinity of 90 percent in some fields where these beetles have been released," says Tamarac Refuge biologist Lowell Deede. Native plants have returned in those areas.

Spotted knapweed is a biennial or short-lived perennial native to Eurasia that reproduces from seed; the three-foot-tall plant with gray-green hairy foliage and pinking purple flowers infests some seven million acres in the United States, especially in Montana, Idaho and Washington. By chemically inhibiting the growth of native vegetation, spotted knapweed can reduce forage and wildlife habitat.

Leafy spurge is an aggressive perennial herb from Europe that has invaded and ruined thousands of acres of rangelands in the western United States. The stems and leaves of the flowering plant contain a substance that is toxic to most grazing mammals. Like spotted knapweed, leafy spurge also chemically inhibits the growth of competing plants.

Host-specific insects are being used to control invasive knapweed/leafy spurge at Tamarac National Wildlife Refuge, MN. (USFWS)

While using insects for weed control can take years longer than chemical pesticides, natural control may be cheaper in the long run and pose fewer health risks, say experts. The aim is to establish and sustain populations of natural enemies that will contain the plant pests indefinitely.

Susan Morse is a writer/editor in the Refuge System Branch of Communications.

Kudos

Meritorious Service

Kevin Kilcullen, chief of visitor services for the National Wildlife Refuge System, has been honored for more than 30 years of outstanding achievement with a Department of the Interior Meritorious Service Award, the second highest honor an employee can receive from the Department.

Kilcullen has been at the center of the Service's cultural resources and heritage programs. The Refuge System is a treasure trove of historical sites and artifacts – from 11,000-year-old sites that contain evidence of the hemisphere's earliest inhabitants to 19th-century sites that tell the story of America's frontier.

Kilcullen played a key role in planning and designing the Service's National Conservation Training Center in Shepherdstown, WV. He also helped shape and strengthen the Service's volunteer program, which attracts more than 36,000 people annually, and the national Friends program.

Refuge Communications

Two newsletters and one marketing campaign from the National Wildlife Refuge System have been cited for excellence by the Association of Marketing and Communication Professionals. The Refuge System's public service campaign urging television viewers to "Get Some Nature into Your Kids" by visiting a national wildlife refuge earned the highest Platinum Award.

The *Friends Forward* quarterly newsletter won a Gold Award and *Refuge Update* received an Honorable Mention. The MarCom Awards are an international creative competition that recognizes outstanding achievement by marketing and communication professionals.

Art work from the TV campaign appeared on buses and in subway stations in the Washington, DC, metro area and inside several major metropolitan airports. This campaign also won a Davey Award for creative excellence by its producer, The PlowShare Group.

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A Look Back . . . Charles "Chuck" Hunt 1944 - 2000

A Transformative Figure

Chuck Hunt grew up in a remote Yupik village in Alaska, rich in culture, subsisting on the resources of nature. Those villages are still remote, but now they have schools, satellites and science. Hunt became the bridge between those two worlds.

A 22-year employee of the U.S. Fish and Wildlife Service, Charles Francis "Chuck" Hunt served as a Native liaison for the Yupik people of western Alaska's Yukon Delta National Wildlife Refuge. Officially, he was a translator between the Upik language and English. Unofficially, his diplomatic approach and sense of humor eased difficult and sometimes tense relations between Native leaders and federal managers.

Jim Kurth, now deputy chief of the National Wildlife Refuge System, worked with Hunt to establish Regional Subsistence Advisory Councils in western Alaska in the early 1990s. He recalls that "Chuck had the ability to live in the traditional Yupik world but also understand that conservation of natural resources required people to understand science." Hunt also taught the Service "how to be respectful of Yupik elders and effective within the Yupik culture."

Hunt worked to engage people in the science of conservation. He was instrumental in the development of the Yukon Delta Goose Management Plan that recognized the value of geese as food for the Native populations but also helped reduce harvests of nesting geese whose populations had seriously declined. His tireless educational efforts in more than 30 villages also resulted in increased use of nontoxic shot for subsistence waterfowl hunting in western Alaska.

Hunt was also eager to bring a new generation of Native leaders into the Service. Kurth remembers how he would always walk into the regional office in Anchorage with his big beaming smile, asking, "How many Native people have you hired?"

Hunt once wrote, "To be a leader, one does not need a title, but care, understanding and concern for the well-being of all people." He was a transformational figure, says Kurth, "a leader within the Service and a leader within the Yupik community."

Charles "Chuck" Hunt (USFWS)

Send Us Your Comments

Letters to the Editor or suggestions about *Refuge Update* can be e-mailed to RefugeUpdate@fws.gov or mailed to *Refuge Update*, USFWS-NWRS, 4401 North Fairfax Dr., Room 634C, Arlington, VA 22203-1610.